

PATENT COOPERATION TREATY

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From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Bergenstråhle & Lindvall AB
Box 17704
118 93 Stockholm
SwedenDate of mailing
(day/month/year)

30-03-2005

Applicant's or agent's file reference

MH 53740

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/SE 2004/001786

International filing date (day/month/year)

01.12.2004

Priority date (day/month/year)

01.12.2003

International Patent Classification (IPC) or both national classification and IPC

C12P7/06, C12N 1/14

Applicant

Swetree Technologies AB et al

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further opinions, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/SE

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**WRITTEN OPINION OF THE
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PCT/SE 2004/001786

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language, _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-33	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-33	NO
Industrial applicability (IA)	Claims	1-33	YES
	Claims		NO

2. Citations and explanations:

The present application pertains to a process for the production of ethanol through fermentation of organic starting materials. In the process, a fungus belonging to the species *Chalara* is used. The fungus is capable of metabolizing pentose compounds. The application also concerns a starter culture comprising *Chalara parvispora* and at least one fungus chosen among *Trametes* sp., *Trichoderma* sp., *Thielavia* sp., *Postia* sp., *Gloeophyllum* sp., and/or *Phanerochaete* sp., Further, a growth medium for the fungi is claimed.

Thus, the problem to be solved by the present application is considered to be to provide a process for fermenting organic starting materials, especially pentose compounds, to ethanol. The solution to this problem is the use of at least one fungus belonging to the species *Chalara* (which has the ability to metabolize pentose compounds).

The following documents, cited in the international search report, are considered to be of particular relevance:

D1: US 4840903

D2: Beckman C.H. et al., *Phytopathology*, 1953, 43, 441-7

D1 is considered to represent the closest prior art.

D1 relates to a process for producing ethanol from plant biomass using the fungus *Paecilomyces* sp. (which has the ability to ferment both cellobiose and xylose to ethanol). One of the purposes of the invention in D1 is to provide a process for fermenting mixtures of various sugar compositions, including five-carbon and six-carbon sugars, to ethanol (column 2, lines 58-63).
.../...

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: V.

D2 reveals that the fungus *Chalara quercina* is able to grow on dextrin and xylose.

The difference between the invention according to the present application (as defined in claim 1) and D1 is considered to be the choice of fungus. The problem which has been solved in the present application in relation to D1 is considered to be to provide alternative fungus/fungi having the capability to ferment pentoses in order to enhance the yield of ethanol. This problem is solved in the present application by using a fungus belonging to the species *Chalara*.

However, since it is previously known from D2 that a fungus of the species *Chalara* has the ability to metabolize both five-carbon (xylose) and six-carbon (dextrin) compounds it is considered to be an obvious alternative for a person skilled in the art to choose *Chalara quercina* as the fungus instead of *Paecilomyces* sp. No unexpected effects have been shown when using *Chalara* instead of *Paecilomyces*.

Further, it is considered to be within the skilled persons knowledge to use other fungi, suitable for the process, in combination with *Chalara*, e.g. *Saccharomyces cerevisiae*. *Trichoderma* sp. etc. A synergistic effect seem to have been shown only for the combination *C. parvispora* and *T. hirsuta* (c.f Table 6 in the description of the present application).

It is also considered to be obvious to the skilled person to optimize the process by choosing a suitable starter culture and adapting the growth medium. Therefore, present claims 1-33 are considered to fulfil the requirements of novelty and industrial applicability, but not that of inventive step.